1.2 Solving Linear Systems by Substitution

Graphically, the solution to a system of linear equations is the point(s) where the lines intersect.

Algebraically, we can:

1. isolate one variable in one equation.

2. substitute the isolated variable into the other equation.

3. solve for the single variable.

4. sub the answer from step 3 into the isolated equation from step 1 to find the other variable.

Ex.1. Solve $y = 3x - 2$ and $x = y - 2$

Sub the y-value from the first equation into the second equation

① $y = \boxed{3x-2}$

② $x = y - 2$

$x = \boxed{}$

$y = \boxed{}$

Sub ① into ②

$x = y - 2$

$x = (3x-2) - 2$

$x = 3x - 2 - 2$

$-3x + x = -4$

$\frac{-2x}{-2} = \frac{-4}{-2}$

$x = 2$

Sub $x = 2$ into ②

$x = y - 2$

$2 = y - 2$

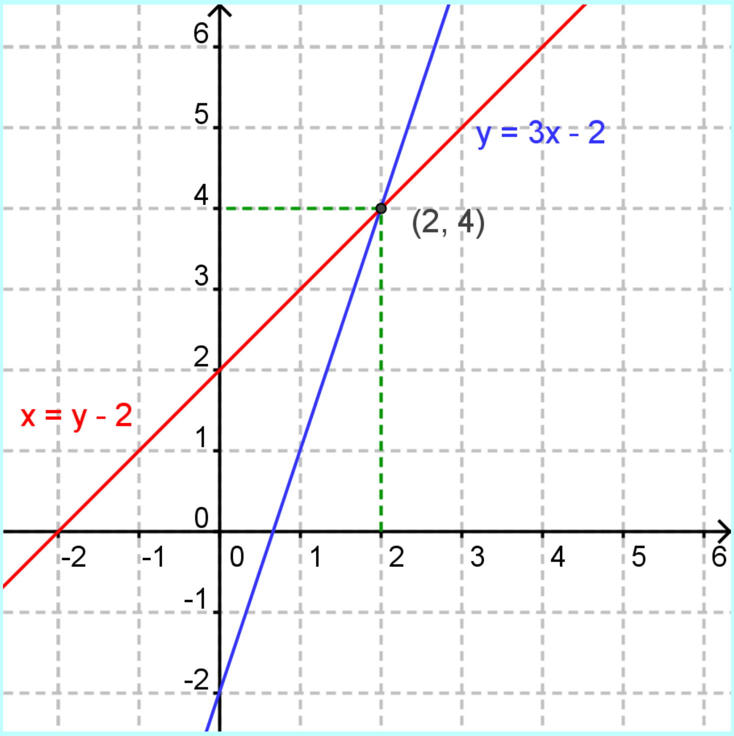
$2 + 2 = y$

$4 = y$

$y = 4$

∴ the POI is $(2, 4)$

Ex.1. Solve y = 3x - 2 and x = y - 2.



Ex.1. Solve y = 3x - 2 and x = y - 2.
The solution is (2, 4), or x = 2 and y = 4.

To perform a formal check of the solution, sub these values into each equation and compare sides.

y = 3x - 2	x = y - 2
$4 = 3(2) - 2$	$2 = 4 - 2$
$4 = 6 - 2$	$2 = 2$
$4 = 4$	

Ex.2. Solve ① $x + 4y = 6$ and ② $2x - 3y = 1$

How do we decide which variable to isolate first?

Isolate x in ①

$x + 4y = 6$

$x = 6 - 4y$

sub ① into ②

$2x - 3y = 1$

$2(6 - 4y) - 3y = 1$

$12 - 8y - 3y = 1$

$12 - 11y = 1$

$-11y = 1 - 12$

$\frac{-11y}{-11} = \frac{-11}{-11}$

$y = 1$

sub y = 1 into ②

$2x - 3y = 1$

$2x - 3(1) = 1$

$2x = 1 + 3$

$\frac{2x}{2} = \frac{4}{2}$

$x = 2$

∴ the solution to the system is $(2, 1)$

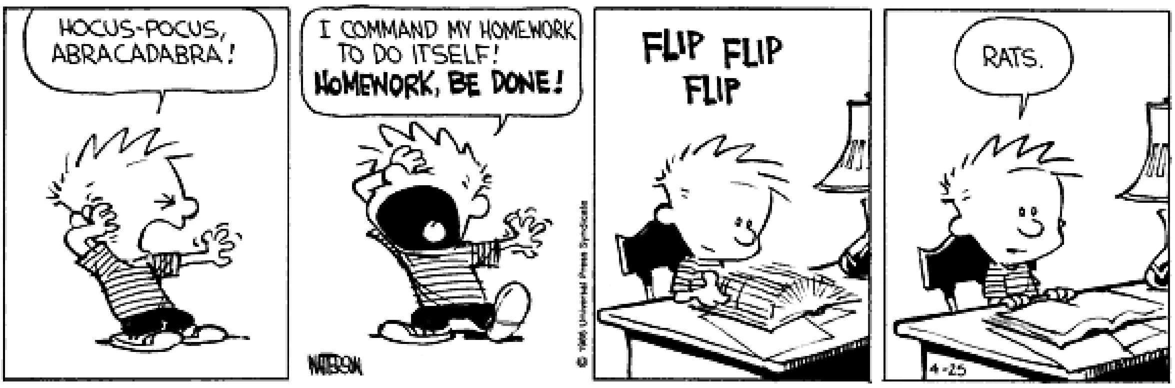
Try this one:

Ex.3. Solve $2y = x + 5$ and $x - 4y = 0$.

∴ the POI is $\left(-10, -\frac{5}{2}\right)$

Assigned Work:

p. 39-40 # 3, 4bf, 5be, 9bcef



Attachments

Basic 2D Grid.agg